What is claimed is:

1. A cam mechanism of a lens barrel, comprising:

a first ring member driven to rotate about an optical axis;

a second ring member which supports an optical element, and is linearly guided along said optical axis without rotating;

a plurality of cam grooves having the same cam diagrams which are formed on one of said first ring member and said second ring member; and

a plurality of cam followers formed on the other of said first ring member and said second ring member to be engaged in said plurality of cam grooves, respectively,

wherein at least two groove/follower groups, each of which includes a front groove/follower set and a rear groove/follower set which are positioned at different positions in said optical axis direction, are positioned at different positions in a circumferential direction, each of said front groove/follower set and said rear groove/follower set including a cam groove of said plurality of cam grooves and an associated cam follower of said plurality of cam followers,

wherein said cam grooves of one of said two

groove/follower groups intersect said cam grooves of another of said two groove/follower groups, respectively, and

wherein at least one of the following two conditions (a) and (b) is satisfied:

(a) a distance in said optical axis direction between said front groove/follower set and said rear groove/follower set of one of said two groove/follower groups is different from a distance in said optical axis between said front groove/follower set and said rear groove/follower set of another of said two groove/follower groups, and

(b) a distance in said circumferential direction between two said front groove/follower sets of said two groove/follower groups is different from a distance in said circumferential direction between two said rear groove/follower sets of said two groove/follower groups.

2. The cam mechanism according to claim 1, wherein said at least two groove/follower groups comprise at least three groove/follower groups which are positioned at intervals in said circumferential direction, and

wherein each said cam grooves of one of said three groove/follower groups intersect all cam grooves of the remaining groups of said three groove/follower groups.

3. The cam mechanism according to claim 1, wherein at least one of the following two conditions (c) and (d) is satisfied:

(c) said front groove/follower sets of said three groove/follower groups are positioned at irregular intervals in said circumferential direction, and

(d) said rear groove/follower sets of said three groove/follower groups are positioned at irregular intervals in said circumferential direction.

4. The cam mechanism according to claim 2, wherein a distance in said optical axis direction between said front groove/follower set and said rear groove/follower set of one of said three groove/follower groups is different from a distance in said optical axis direction between said front groove/follower set and said rear groove/follower set of another of said three groove/follower groups.

5. The cam mechanism according to claim 2, wherein said cam groove of said front groove/follower set and said cam groove of said rear groove/follower set are different in at least one of width and depth for at least one of said three groove/follower groups.

6. The cam mechanism according to claim 5, wherein the width relationship between said cam groove of said front groove/follower set and said cam groove of

said rear groove/follower set of one of said three groove/follower groups is different from that between said cam groove of said front groove/follower set and said cam groove of said rear groove/follower set of another of said three groove/follower groups.

7. The cam mechanism according to claim 1, wherein two cam grooves of said plurality of cam grooves which are adjacent in the circumferential direction are different in at least one of width and depth.

8. The cam mechanism according to claim 1, wherein the sum of the number of said front groove/follower sets and the number of said rear groove/follower sets is six.

9. The cam mechanism according to claim 1, wherein said optical element comprises at least one lens group of a lens system provided in said lens barrel.

10. The cam mechanism according to claim 1, wherein said lens system comprises a zoom lens optical system.

11. The cam mechanism according to claim 1, wherein said first ring member is fitted on said second ring member to be positioned coaxial with said second ring member.

12. The cam mechanism according to claim 11, wherein said plurality of cam grooves are formed on an

inner peripheral surface of said first ring member, and said plurality of cam followers are formed on an outer peripheral surface of said second ring member.

13. The cam mechanism according to claim 12, wherein said first ring member comprises another plurality of cam grooves formed on an outer peripheral surface of said first ring member.

14. The cam mechanism according to claim 1, wherein said first ring member comprises a spur gear which is formed on an outer peripheral surface of said first ring member in the vicinity of the rear end thereof to be engaged with a drive pinion.

15. The cam mechanism according to claim 1, wherein teeth of said spur gear are formed on the thread of a male helicoid formed on said outer peripheral surface of said first ring member.

16. The cam mechanism according to claim 15, wherein said lens barrel comprises a stationary barrel having a female helicoid formed on an inner peripheral surface of said stationary barrel, and

wherein said male helicoid of said first ring member is engaged with said female helicoid of said stationary barrel.

17. The cam mechanism according to claim 1, wherein said first ring member rotates while moving

along said optical axis when driven to rotate.